Practice for all formulas

In the table below fill in the appropriate triangle(s) used and give the unit for each variable.

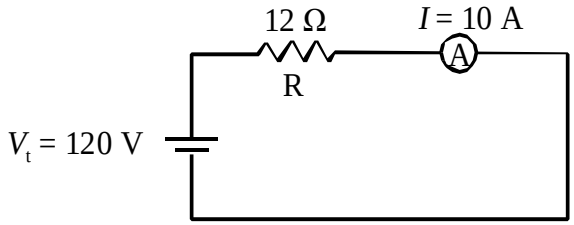
Voltage	Power	Energy - 2 formulas

Convert the following time units:

Min to sec	_____	W to kW	_____
J to kJ	_____	J to kWh	_____
Sec to hrs	_____	Sec to min	_____
Hrs to sec	_____	kW to W	_____

Using the above formulas and conversions, solve the following problems. Show all work.

1. The circuit diagram shown below represents a heater with a resistance of 12 Ω through which flows a current of 10 A. This heater is connected to a power source of 120 volts. The heater was used for 20 minutes.



How much electric energy did the heater use?

A) 14 400 J B) 24 000 J C) 28 800 J D) 1 440 000 J

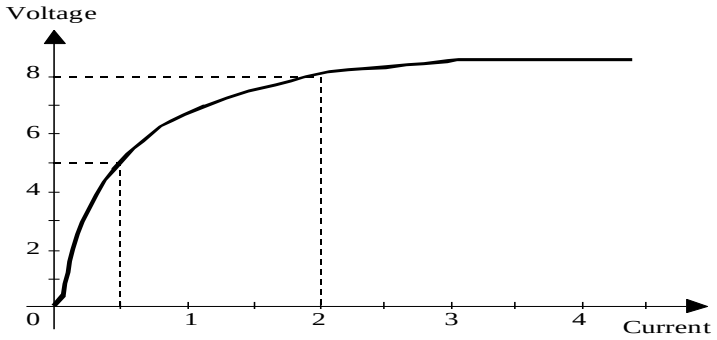
2. What is the current drawn when a kettle with a power of 1.65 kW is connected to a110V power supply?

A) 0.0150 A B) 1.50 A C) 15.0 A D) 66.7 A

3. What is the power of an electric bulb that gives off 3600 J of energy in 10 minutes?

A) 6.0 kW B) 2.8 kW C) 6.0 W D) 360 W

4. The following graph shows the variation of the voltage across the terminals of a ceramic element as a function of the intensity of the current passing through it.



What power is dissipated when this ceramic element is connected to a voltage of 5.0 V?

A) 20 W B) 10.0 W C) 5.0 W D) 2.5 W

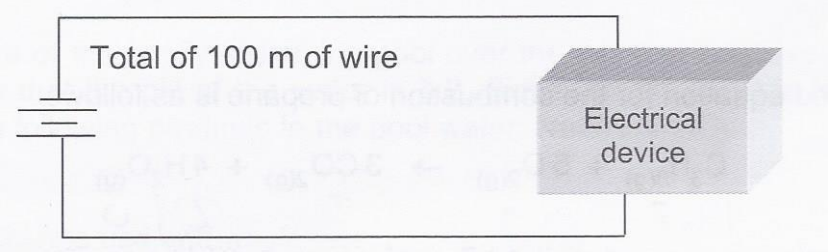
5. The rating plate below indicates the characteristics of Jasmine's hair dryer

MODEL – J45-TX2	
110 V	1200 W

Jasmine took 15 minutes to dry her hair. How much electrical energy did Jasmine use to dry her hair?

A) 300 J B) 18 000 J C) 99 000 J D) 1 080 000 J

6. Wires create resistance to the flow of an electric current. This means that there is a drop in the voltage and that the wire heats up. An electrical circuit consists of a power source, an electrical device and 100 m of wire, as shown in the diagram below.



In this circuit, when the current intensity is 4 A, the maximum voltage drop due to the resistance of the wire is 1.32 V. What resistance value in the wire causes this voltage drop?

A) 0.053 Ω B) 0.33 Ω C) 3.03 Ω D) 5.28 Ω

7. When Marina gets ready in the morning, she uses different electrical devices. The following table indicates the power of each device and the amount of time it is used every day.

Power of Different Devices

	Device	Power	Amount of time used
1	Hair dryer	1.8 kW	120 s
2	Toaster oven	1 100 W	190 s
3	Coffee makes	1.5 kW	130 s

Which of the following choices consumes the most energy to the least energy?

A) 1 – 2 – 3 B) 1 – 3 – 2 C) 2 – 1 – 3 D) 3 – 2 – 1

8. Which of the following would reduce the cost of using an electrical appliance?

1. Increase the operation time.
2. Reduce the operation time.
3. Use an appliance with a lower power rating.
4. Use an appliance with a higher power rating.

A) 1 and 3 B) 1 and 4 C) 2 and 3 D) 3 and 4

9. A radio is on for 3 hours and has 400 W of power. What is the energy in kWh?

10. How much time elapsed in hours if a TV used 550 000 J of energy and needs 400 W of power?

11. If a TV used 700 000 J of energy and 100 W of power. How many hours did you watch TV for?

12. What is the potential difference when a microwave runs on 1.2 A and uses 300 W of power

13. What is the power needed for a compute to be on for 4 hours which produced 5 000 J of energy?

14. What is the voltage if an overhead 300 W of power and 1.5 A?

15. What was the potential difference of a computer that used 55 000 J of energy when it was on for 2 hours and had 1.2 A?

16. How much time passed in minutes when a computer did 700 000 J of work and had 550 W of power?

17. What was the current intensity of a clock radio that used 50 000 J of energy when it was on for 5 hours and had 210 V?

18. What is the power in kW when a dishwasher used 20 V and 2.5 A?

19. Two ovens were used to bake the prize winning apple pies:

Oven A: is connected to a 220 V wall outlet that draws a current of 14 A. In this oven it took 1 hour to bake the pies.

Oven B: took 2 hours to bake the pies in the 2 400 W oven.
Given that consuming less energy is more environmentally friendly, which oven should the bakery use if they want to be environmentally conscious?

20. You want to plug a stove into an electrical outlet whose circuit breaker allows for a current of up to 40 A. Read the appliance's rating plate below, and then determine whether or not the stove can be plugged into this outlet without activating the circuit breaker. Justify your answer.

Stove's Rating Plate

Stove B-35-	
240 V	9 000W
C.A.	60 Hz